

5.3 Cultural Resources

5.3.1 Introduction

The Applicant proposes to develop a solar energy project called the Ivanpah Solar Electric Generating System (Ivanpah SEGS). It will be located in southern California's Mojave Desert, near the Nevada border, to the west of Ivanpah Dry Lake. The project will be located in San Bernardino County, California, on federal land managed by the Bureau of Land Management (BLM). It will be constructed in three phases: two 100-megawatt (MW) phases (known as Ivanpah 1 and 2) and a 200-MW phase (Ivanpah 3). The phasing is planned so that Ivanpah 1 (the southernmost site) will be constructed first, followed by Ivanpah 2 (the middle site), then Ivanpah 3 (the 200-MW plant on the north), though the order of construction may change. Each 100-MW site requires about 850 acres (or 1.3 square miles); the 200-MW site is about 1,660 acres (or about 2.6 square miles). The total area required for all three phases, including the Administration/Operations and Maintenance building and substation, is approximately 3,400 acres. The Applicant has applied for a right-of-way grant for the land from BLM. Although this is a phased project, it is being analyzed as if all phases are operational.

The heliostat (or mirror) fields focus solar energy on the power tower receivers near the center of each of the heliostat arrays (the 100-MW plants have three arrays and the 200-MW plant has four arrays). In each plant, one Rankine-cycle reheat steam turbine receives live steam from the solar boilers and reheat steam from one solar reheater – located in the power block at the top of its own tower. The solar field and power generation equipment are started each morning after sunrise and insolation build-up, and shut down in the evening when insolation drops below the level required to keep the turbine online.

Ivanpah 1, 2 and 3 will be interconnected to the Southern California Edison (SCE) grid through upgrades to SCE's 115-kilovolt (kV) line passing through the site on a northeast-southwest right-of-way. These upgrades will include the construction by SCE of a new 220/115-kV breaker-and-a-half substation between the Ivanpah 1 and 2 project sites. This new substation and the 220-kV upgrades will be for the benefit of Ivanpah and other Interconnection Customers in the region. The existing 115-kV transmission line from the El Dorado substation will be replaced with a double-circuit 220-kV overhead line that will be interconnected to the new substation. Power from Ivanpah 1, 2 and 3 will be transmitted at 115 kV to the new substation. SCE plans to add three new 115-kV lines to increase capacity to the existing El Dorado-Baker-Cool Water-Dunn Siding-Mountain Pass 115-kV line heading southwest. The timing of this upgrade depends upon the development of wind projects ahead in the queue, and is not affected by the Ivanpah SEGS project.

Each phase of the project includes a small package natural gas-fired start-up boiler to provide heat for plant start-up and during temporary cloud cover. The project's natural gas system will be connected to the Kern River Gas Transmission Line, which passes less than half a mile to the north of the project site. Raw water will be drawn daily from one of two onsite wells, located east of Ivanpah 2. Each well will have sufficient capacity to supply water for all three phases. Groundwater will go through a treatment system for use as boiler make-up water and to wash the heliostats. To save water in the site's desert environment, each plant will use a dry-cooling condenser. Water consumption is, therefore, minimal

(estimated at no more than 100 acre-feet/year for all three phases). Each phase includes a small onsite wastewater plant located in the power block that treats wastewater from domestic waste streams such as showers and toilets. A larger sewage package treatment plant will also be located at the Administration Building/Operations and Maintenance area, located between Ivanpah 1 and 2. Sewage sludge will be removed from the site by a sanitary service provider. No wastewater will be generated by the system, except for a small stream that will be treated and used for landscape irrigation. If necessary, a small filter/purification system will be used to provide potable water at the Administration Building.

This section determines whether cultural resources are present and could be affected adversely by the construction and operation of the Ivanpah SEGS. The significance of any potentially affected resources is assessed, and measures are proposed to mitigate potential adverse project effects. This study was conducted by Clint Helton, M.A., RPA, a Cultural Resource Specialist who meets the qualifications for Principal Investigator stated in the Secretary of the Interior's standards and guidelines for archaeology and historic preservation (USNPS, 1983). This study was performed consistent with California Environmental Quality Act (CEQA) compliance procedures and Section 106 of the National Historic Preservation Act (NHPA) set forth at 36 CFR 800.

This section is consistent with state regulatory requirements for cultural resources pursuant to CEQA. The study scope was developed in consultation with the California Energy Commission's (CEC) cultural resources staff and complies with *Instructions to the California Energy Commission Staff for the Review of and Information Requirements for an Application for Certification* (CEC, 1992) and *Regulations Pertaining to the Rules of Practice and Procedure and Power Plant Site Certification* (CEC, 2007).

Cultural resources include prehistoric and historic archaeological sites;¹ districts and objects; standing historic structures, buildings, districts, and objects; and locations of important historic events, or sites of traditional/cultural importance to various groups.²

Section 5.3.2 discusses the laws, ordinances, regulations, and standards (LORS) applicable to the protection of cultural resources. Section 5.3.3 describes the cultural resources environment that might be affected by the Ivanpah SEGS project. Section 5.3.4 discusses the environmental effects of construction of the proposed development. Section 5.3.5 determines whether there are any cumulative effects from the project, and Section 5.3.6 presents

1 Site: "The location of a significant event, a prehistoric or historic occupation or activity, or a building or structure...where the location itself possesses historic, cultural, or archeological value." (USNPS-IRD 1991:15).

2 The federal definitions of cultural resource, historic property or historic resource, traditional use area, and sacred resources are reviewed below and are typically applied to non-federal projects.

A cultural resource may be defined as a phenomenon associated with prehistory, historical events or individuals or extant cultural systems. These include archaeological sites, districts, and objects; standing historic structures, districts, and objects; locations of important historic events; and places, objects and living or non-living things that are important to the practice and continuity of traditional cultures. Cultural resources may involve historic properties, traditional use areas, and sacred resource areas.

Historic property or historic resource means any prehistoric district, site building, structure, or object included in, or eligible for, inclusion in the National Register of Historic Places (NRHP). The definition also includes artifacts, records and remains that are related to such a district, site, building, structure, or object.

Traditional use area refers to an area or landscape identified by a cultural group to be necessary for the perpetuation of the traditional culture. The concept can include areas for the collection of food and non-food resources, occupation sites, and ceremonial and/or sacred areas.

Sacred resources applies to traditional sites, places, or objects that Native American tribes or groups, or their members, perceive as having religious significance.

mitigation measures that will be implemented to avoid construction impacts. Section 5.3.7 lists the agencies involved and agency contacts, and Section 5.3.8 discusses permits and the permitting schedule. Section 5.3.9 lists reference materials used in preparing this section.

Per CEC Data Adequacy requirements, Appendix 5.3A provides copies of agency consultation letters. Confidential Appendix 5.3B provides the technical report including DPR 523 forms for newly-recorded resources. Confidential Appendix 5.3C provides a copy of the CHRIS literature search results including copies of previous technical reports occurring within 0.25 mile of the project, and DPR 523 forms for previously recorded resources occurring within 1 mile of the project and 0.25 mile of linear facilities. Appendix 5.3D provides names and qualifications of personnel who contributed to this study. Confidential Appendix 5.3E provides maps of the project and known cultural resources that occur within one mile of the project or 0.25 mile of linear facilities.

5.3.2 Laws, Ordinances, Regulations, and Standards

Cultural resources are non-renewable scientific and educational resources and are protected by several federal and state statutes (California Office of Historic Preservation, 1983), most notably by the NHPA (36 CFR 800), the 1906 Federal Antiquities Act, and by the State of California's environmental regulations (CEQA, Section 15064.5). Construction of the proposed Ivanpah SEGS project will be conducted in accordance with all LORS applicable to cultural resources. Federal, state, and local LORS applicable to cultural resources are summarized in Table 5.3-1 and discussed briefly below.

TABLE 5.3-1
Laws, Ordinances, Regulations, and Standards Applicable to Ivanpah SEGS Cultural Resources

LORS	Requirements/Applicability	Administering Agency	AFC Section Explaining Conformance
Federal			
Antiquities Act of 1906	Protects archaeological resources on federal lands; requires inventory, assessment of effects, and mitigation if appropriate.	Bureau of Land Management	Section 5.3.2.1
National Historic Preservation Act	Protects archaeological resources on federal lands; requires inventory, assessment of effects, and mitigation if appropriate.	Bureau of Land Management	Section 5.3.2.1
Archaeological Resources Protection Act	Protects archaeological resources from vandalism and unauthorized collecting on federal land	Bureau of Land Management	Section 5.3.2.1
Native American Graves Protection and Repatriation Act	Assigns ownership of Native American graves on federal land to Native American descendants or culturally affiliated organizations	Bureau of Land Management	Section 5.3.2.1
State			

TABLE 5.3-1

Laws, Ordinances, Regulations, and Standards Applicable to Ivanpah SEGS Cultural Resources

LORS	Requirements/Applicability	Administering Agency	AFC Section Explaining Conformance
California Environment Quality Act Guidelines	Project construction may encounter archaeological and/or historical resources	California Energy Commission	Section 5.3.2.2
Health and Safety Code Section 7050.5	Construction may encounter Native American graves; coroner calls the Native American Heritage Commission (NAHC)	California Energy Commission	Section 5.3.2.2
Public Resources Code Section 5097.98	Construction may encounter Native American graves; NAHC assigns Most Likely Descendant	California Energy Commission	Section 5.3.2.2
Public Resources Code Section 5097.5/5097.9	Would apply only if some project land were acquired by the state (currently no state land)	California Energy Commission	Section 5.3.2.2
Local			
San Bernardino County General Plan	Emphasizes the conservation of resources having the potential to provide information important in history and prehistory	County of San Bernardino	Section 5.3.2.3

5.3.2.1 Federal LORS

Archaeological and architectural resources (buildings and structures) are protected through the NHPA of 1966 (16 USC 470f) and its implementing regulation, Protection of Historic Properties (36 CFR Part 800), the Archaeological and Historic Preservation Act of 1974, and the Archaeological Resources Protection Act of 1979. Section 106 of the NHPA requires federal agencies (Bureau of Indian Affairs, BLM, Bureau of Reclamation, U.S. Army Corps of Engineers, etc.), prior to implementing an “undertaking” (e.g., issuing a federal permit), to consider the effects of the undertaking on historic properties and to afford the Advisory Council on Historic Preservation (ACHP) and the State Historic Preservation Office (SHPO) a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing on the National Register of Historic Places (NRHP). Section 101(d)(6)(A) of the NHPA allows properties of traditional religious and cultural importance to a tribe to be determined eligible for inclusion in the NRHP.

Under the NHPA, a find is significant if it meets the NRHP listing criteria at 36 CFR 60.4:

- The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and:
 - that are associated with events that have made a significant contribution to the

- broad patterns of our history, or
- that are associated with the lives of persons significant in our past, or
- that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or
- that have yielded, or may be likely to yield, information important in prehistory or history.

Cultural institutions, lifeways, culturally valued viewsheds, places of cultural association, and other valued places and social institutions must also be considered under the National Environmental Protection Act (NEPA), Executive Order 12898, and sometimes other authorities.

The American Indian Religious Freedom Act of 1978 allows access to sites of religious importance to Native Americans. On federal land, the Archaeological Resources Protection Act (ARPA) and Native American Graves Protection and Repatriation Act (NAGPRA) would apply. ARPA assigns penalties for vandalism and the unauthorized collection of archaeological resources on federal land and provides for federal agencies to issue permits for scientific excavation by qualified archaeologists. NAGPRA assigns ownership of Native American graves found on federal land to their direct descendants or to a culturally affiliated tribe or organization and provides for repatriation of human remains and funerary items to identified Native American descendants.

If a federal permit of any kind is needed (such as a Clean Water Act [CWA] Section 404 permit from the U.S. Army Corps of Engineers), the NHPA and its implementing regulations (16 USC 470 et seq., 36 CFR 800, 36 CFR 60, and 36 CFR 63) will apply. The NHPA establishes the federal government's policy on historic preservation and the programs, including the NRHP, through which that policy is implemented. Under the NHPA, historic properties include "*any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places*" (16 USC 470w (5)).

5.3.2.2 State LORS

CEQA requires a review to determine if a project will have a significant effect on archaeological sites or a property of historic or cultural significance to a community or ethnic group eligible for inclusion in the California Register of Historical Resources (CRHR) (CEQA Guidelines). CEQA equates a substantial adverse change in the significance of a historical resource with a significant effect on the environment (Section 21084.1 of the Public Resources Code) and defines substantial adverse change as demolition, destruction, relocation, or alteration that would impair historical significance (Section 5020.1).

Section 21084.1 stipulates that any resource listed in, or eligible for listing in, the CRHR³ is presumed to be historically or culturally significant.⁴

Resources listed in a local historic register or deemed significant in a historical resource survey (as provided under Section 5024.1g) are presumed historically or culturally significant unless the preponderance of evidence demonstrates they are not.

A resource that is not listed in or determined to be eligible for listing in the CRHR, is not included in a local register of historic resources, nor deemed significant in a historical resource survey, may nonetheless be historically significant (Section 21084.1; see Section 21098.1).

CEQA requires a Lead Agency to identify and examine environmental effects that may result in significant adverse effects. Where a project may adversely affect a unique archaeological resource,⁵ Section 21083.2 requires the Lead Agency to treat that effect as a significant environmental effect and prepare an Environmental Impact Report. When an archaeological resource is listed in or is eligible to be listed in the CRHR, Section 21084.1 requires that any substantial adverse effect to that resource be considered a significant environmental effect. Sections 21083.2 and 21084.1 operate independently to ensure that potential effects on archaeological resources are considered as part of a project's environmental analysis. Either of these benchmarks may indicate that a project may have a potential adverse effect on archaeological resources.

Other state-level requirements for cultural resources management appear in the California Public Resources Code Chapter 1.7, Section 5097.5 (Archaeological, Paleontological, and Historical Sites), and Chapter 1.75, beginning at Section 5097.9 (Native American Historical, Cultural, and Sacred Sites) for lands owned by the state or a state agency.

The disposition of Native American burials is governed by Section 7050.5 of the California Health and Safety Code and Sections 5097.94 and 5097.98 of the Public Resources Code, and falls within the jurisdiction of the NAHC.

If human remains are discovered, the San Bernardino County Coroner must be notified within 48 hours and there should be no further disturbance to the site where the remains were found. If the remains are determined by the coroner to be Native American, the

3 The CRHR is a listing of "...those properties which are to be protected from substantial adverse change." Any resource eligible for listing in the California Register is also to be considered under CEQA.

4 A historical resource may be listed in the CRHR if it meets one or more of the following criteria: "(1) is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States; (2) is associated with the lives of persons important to local, California or national history; (3) embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or (4) has yielded or has the potential to yield information important in prehistory or history (...of the local area, California or the nation)" (Public Resources Code §5024.1, Title 14 CCR, Section 4852). Automatic CRHR listings include NRHP listed and determined eligible historic properties (either by the Keeper of the NRHP or through a consensus determination on a project review); State Historical Landmarks from number 770 onward; and Points of Historical Interest nominated from January 1998 onward. Landmarks prior to 770 and Points of Historical Interest may be listed through an action of the State Historical Resources Commission.

5 Public Resources Code 21083.2 (g) defines a unique archaeological resource to be: An archaeological artifact, object, or site, about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria: (1) contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information; (2) has a special and particular quality such as being the oldest of its type or the best available example of its type; or (3) is directly associated with a scientifically recognized important prehistoric or historic event or person.

Coroner is responsible for contacting the NAHC within 24 hours. The NAHC, pursuant to Section 5097.98, will immediately notify those persons it believes to be most likely descended from the deceased Native American so they can inspect the burial site and make recommendations for treatment or disposal.

5.3.2.3 Local LORS

California Planning and Zoning Law requires each county and city jurisdiction to adopt a comprehensive, long-term General Plan for its development. The General Plan is a policy document designed to give long range guidance to those making decisions affecting the future character of the planning area. It represents the official statement of the community's physical development as well as its environmental goals. The General Plan also acts to clarify and articulate the relationship and intentions of local government to the rights and expectations of the general public, property owners, and prospective investors. Through its General Plan, the local jurisdiction can inform these groups of its goals, policies, and development standards; thereby communicating what must be done to meet the objectives of the General Plan.

The *Conservation Element of the San Bernardino County General Plan* (County of San Bernardino, 2007) notes that the County intends to preserve and promote its historic and prehistoric cultural heritage. These include the preservation and protection of resources within sensitive areas, compliance with Senate Bill 18, which requires consultation with Native Americans on General Plan actions, and establishing programs to preserve cultural and historical resources. The cultural resources section of the "San Bernardino County Initial Study Environmental Checklist Form" specifically asks if a given project would cause a substantial adverse change in the significance of an archaeological or historical resource.

5.3.3 Affected Environment

In southern California, cultural resources extend back in time for at least 11,500 years. Written historical sources tell the story of the past 200 years. Archaeologists have reconstructed general trends of prehistory.

5.3.3.1 Regional Setting

The proposed Ivanpah SEGS facility site is on BLM-managed land within the BLM's California Desert District in far eastern San Bernardino County. The border with Nevada lies 4.5 miles to the northwest and the site lies in the northwestern quarter of the Ivanpah Valley. The project site is located in the northwestern quarter of the Ivanpah Valley, which is a largely uninhabited valley in the central Mojave Desert. It would occupy the middle reaches of the alluvial fan complex (bajada) that extends to the east from the Clark Mountains that lie approximately 2 miles to the west. The toe of the bajada is approximately 1.8 miles to the east at the edge of Ivanpah Dry Lake, a playa that occupies the central and lowest portion of the valley.

5.3.3.2 Prehistoric Period

The general trend throughout California prehistory has been an increase in population density over time, coupled with greater sedentism and the use of a greater diversity of food resources. There is abundant evidence that humans were present in the New World for at least the past

11,500 years. There is also fragmentary, but growing, evidence that humans were present long before that date. Linguistic and genetic studies suggest that a date of 20,000 to 40,000 years ago for the human colonization of the New World may be correct. The evidence of this earlier occupation is not yet conclusive, but it is beginning to be accepted by archaeologists. The Meadowcroft Rockshelter in Pennsylvania and Monte Verde in Chile, for instance, are two early sites that have produced apparently reliable dates as early as 12,500 years before present. These earliest known remains indicate very small, mobile populations, apparently dependent on hunting of large game animals as the primary subsistence strategy.

5.3.3.2.1 Prehistory (12,000 to 200 B.P.)

Although typically grouped within the Great Basin culture area (D'Azevedo, 1986), the region is situated along the edge of a number of major culture areas and a number of significant prehistoric cultures. Because the area is situated at the crossroads of several distinct cultural traditions, it is difficult to assign a comprehensive sequence of phases for the entire area. A substantial body of research has resulted in the production of a number of chronologies, many of which incorporate and summarize previous research (Ahlstrom and Roberts, 1999; Blair et al., 1999; Ezzo et al., 1995; Fowler and Madsen, 1986; Fowler et al., 1973; Kelly et al., 1990; Lyneis, 1982, 1995; Seymour, 1999; D. Seymour et al., 1996; G. Seymour et al., 1996; Shutler, 1961; Warren and Crabtree, 1986). For the purposes of outlining the prehistoric culture history, this report uses a variant of the terminology employed by Fowler and Madsen (1986), which divides the period into a Pre-Archaic (called Paleoindian) Period, the Archaic Period, the Horticultural Period or Saratoga Springs Phase, and the Numic Period.

5.3.3.2.2 Paleoindian Period (Approximately 12,000 to 7000 B.P./5000 B.C.)

Paleoindian Period occupation in the immediate region is poorly known. Surface finds of fluted points have been noted in the area, but well-preserved and investigated occupations are rare (Fowler and Madsen, 1986:173). The period has been defined in the immediate project area as the Lake Mojave Period (Lyneis, 1982; Warren and Crabtree, 1986). Some of the earliest excavated evidence of occupation in the area is from the Tule Springs site (Wormington and Ellis, 1967), where large mammal remains were found along with artifacts, but no fluted projectile points were present, and the association of faunal material and artifacts is not clear (Ahlstrom and Roberts 1999).

5.3.3.2.3 Archaic Period (Approximately 7000/5000 B.C. to A.D. 300)

The Archaic Period, as defined by hunting and gathering adaptations, is a long period in the Great Basin and can arguably be extended to the period of Euro American contact. In various areas of the region, the period has been subdivided into Early, Middle, and Late periods or into sub-phases (see Fowler and Madsen, 1986; Lyneis, 1982; Schroedl, 1995; Warren and Crabtree, 1986). Diagnostic artifacts and other attributes of material culture are associated with these subdivisions of the Archaic Period with greater and lesser degrees of success in applicability.

In the southern portion of the region, the latter part of the Archaic Period (approximately 300 B.C. to A.D. 500) is associated with the Anasazi and is referred to as either the Moapa Phase or the Basketmaker II Phase (for chronologies following the Pecos system) (Lyneis, 1995; Shutler, 1961). Sites of this phase are characterized by pit structures, storage cists, and basketry but lack ceramics (Lyneis, 1995:210-211).

5.3.3.2.4 Horticultural Period – Saratoga Springs Phase (A.D. 500 to 1200)

Over portions of the Great Basin and surrounding regions during the latter portion of the first millennium A.D., populations developed horticulture and shifted to more sedentary lifeways. In the greater West, this happened predominantly in several major areas, and the project region lies at the juncture of the spatial distribution of two of these cultures – the Anasazi and the Patayan. The Anasazi were primarily centered east of the region, in the San Juan Basin, southwest Colorado, southeast and south-central Utah, and northern Arizona (Cordell, 1984). However, a major and relatively well-known branch of the Anasazi culture, termed the Virgin Anasazi, occupied the Moapa Valley and the Virgin river area near the project region (Lyneis, 1995). Patayan occupation is primarily centered on the extreme southern portion of the Colorado River drainage in Nevada. It is difficult to sort out the relationships and potential interactions of these groups.

5.3.3.2.5 Virgin Anasazi

The Virgin Anasazi are characterized by use of agriculture (maize, gourds, and possibly cotton), pit structures and aboveground masonry structures, possibly the use of kivas, and ceramics (Lyneis, 1995). Many of these features are similar to those of Kayenta Anasazi material remains to the east, accounting for the denomination of Anasazi in the Virgin River area.

A phase system for the Virgin Anasazi was developed by Shutler (1961). This system roughly corresponds to the Pecos Classification system used for Anasazi populations to the east, and a number of researchers use the Pecos nomenclature rather than Shutler's phases (Lyneis, 1995). The earliest phase is the Muddy River/Basketmaker III phase (approximately A.D. 500-800). The subsequent Lost City/Pueblo I-Early Pueblo II phase (A.D. 800-1150) is characterized at the onset by similarities with the previous phase. Pueblo I (A.D. 800-1000) occupations continue to consist of pit structures, now with occasional benches, and cist placement outside the structures is more formalized (end-to-end in arcs or curves) (Lyneis, 1995). By Pueblo II (A.D. 1000-1150), some pit structures are more elaborate, sometimes with ventilator shafts, and larger aggregations have been noted (Lyneis, 1995). In the latter portion of this period, pit structures were arranged into groups of contiguous rooms around courtyards, and aboveground masonry room blocks have been investigated that date to this time (Fowler and Madsen, 1986; Lyneis, 1995). The final period of Virgin Anasazi occupation is termed the Mesa House Phase/Pueblo III (A.D. 1150-1200). Most Virgin Anasazi occupations are abandoned by the early 14th century A.D.

5.3.3.2.6 Patayan

The term "Patayan Culture," which incorporates groups previously called "Yuman," is used to encompass peoples predominantly in the lower Colorado River drainage and the Sonoran Desert, Mojave Desert, and northern Baja California who practiced agriculture and used ceramics (Seymour 1999:18). The Patayan Period has been divided into three phases: Patayan I (A.D. 500-1050), Patayan II (A.D. 1050-1500), and Patayan III (A.D. 1500-contact) (Seymour 1999:20). Patayan sites are characterized primarily by rock-lined jacal structures, rock-filled roasting pits, and simple dry-masonry structures. Cultural features also associated with the Patayan tradition include what have been called "intaglios," "earth figures," or "geoglyphs." These consist of areas where desert pavement has been removed to create shapes and figures (Ezzo et al., 1995:64). Stone alignments and rock rings may also be associated with the Patayan in the region (Ezzo et al., 1995:64-65).

5.3.3.2.7 Numic Period (A.D. 1200 to 1826)

Beginning at around A.D. 1200 throughout the Great Basin, small triangular arrow points (Desert Side-notched and Cottonwood Triangular) became more common along with a distinctive brownware pottery called “Intermountain Brownware” or “Shoshonean Ware.” The appearance of these ceramics and other aspects of material culture has been taken as evidence of an expansion of Numic-speaking peoples into the region from the Mojave Desert area (Madsen, 1975; see also Lamb, 1958; Bettinger and Baumhoff, 1982; Rhode and Madsen, 1994). The model is premised on the fact that Numic-speaking groups were present in the area at the time of contact, as well as glotto-chronological evidence suggesting that the languages spoken by these groups (primarily Shoshone, Paiute, and Ute) shared a common origin and began to diverge approximately 1,000 years ago (Rhode and Madsen, 1994). However, whether the changes noted in the material culture (e.g., the appearance of new projectile point types and pottery) represents replacement of local populations, absorption into new linguistic and cultural groups, or simply cultural change by indigenous populations remains an open debate (see Aikens and Witherspoon, 1986; Lyneis, 1982).

5.3.3.3 Ethnographic Setting

It is believed that Numic-speaking people entered what is now known as southeastern California and southern Nevada between 1,000 to 5,000 years ago (Rhode and Madsen, 1994). It is generally thought by scholars and is related in various Native American oral histories that these people came from the western coastal area. According to the available archival records and literature, the Numic-speaking people known to have used the general vicinity are the Western Shoshone and the Southern Paiute. These groups were culturally similar, subsisting on plant gathering, particularly seeds, and small game, including insects. The following provides a brief overview of these tribal groups and their lifeways as they pertain to land use within the general vicinity of the project area.

5.3.3.3.1 Southern Paiute

The aboriginal territories of the Southern Paiute extended across southern Utah and Nevada, northern Arizona, and down along the western side of the Colorado River to present-day Blyth, California. Kelly and Fowler (1986) listed at least 16 Southern Paiute groups or bands, which each had their own territories within these lands. Martineau (1992) recorded the names of 27 bands, many of which no longer exist. Surviving members of these bands now reside off-reservation, as well as on small reservations and other tribal lands throughout Utah, Arizona, California, and Nevada.

Like other Numic tribes, the Southern Paiute were hunters and gatherers and generally migrated on a seasonal basis within particular group territories. These annual cycles differed among bands based on individual band territorial habitats. Habitation sites, especially living quarters, also varied according to the environmental habitat. Many, if not all, campsites were situated near springs. Domicile types of the Southern Paiutes included caves, conical brush shelters called wickiups, and shades made by placing brush in the tops of trees (Kelly and Fowler, 1986).

As stated previously, the Southern Paiutes were hunters and gatherers; however, a few of the bands practiced a small amount of horticulture (Steward, 1997; Kelly and Fowler, 1986). Cultivated crops included corn, squash, melon, gourd, sunflower, amaranth, winter wheat, and devil’s claw (Kelly and Fowler, 1986). In this respect, the Southern Paiutes differed from

the Western Shoshones (Steward, 1997). Plant gathering methods employed by the Southern Paiutes were primarily the same as those used by other Numic people. Staple plant foods included pine nuts, agave, and seeds. Other plants used for food included buffalo berries, choke cherries, currants, elderberries, gooseberries, raspberries, serviceberries, squaw berries, strawberries, cacti, yucca fruit, cattail, tule, and mescal. Seeds, mostly from grasses, were gathered with a seed beater, parched on a flat tray, and stored in a conical container. Berries were either eaten fresh or dried and stored in a buckskin bag. Roots, like the sego root, were collected with a digging stick (Kelly and Fowler, 1986).

Hunting methods of the Southern Paiutes were similar to those of other Numic people, adapted to meet the local physical environment. The primary game were small animals including rabbits, woodrats, mice, gophers, squirrels, chipmunks, and birds. They held organized drives to capture and kill rabbits. The capture of large game, such as mountain sheep, was often accomplished with the aid of magical devices. Other animals hunted for food included lizards, snakes, bird eggs and baby birds, locusts, ant larvae, and caterpillars (Kelly and Fowler, 1986).

5.3.3.2 Western Shoshone

Steward (1937) divided the Shoshones into three groups (Western Shoshone, Northern Shoshone and Bannock, and Eastern Shoshone). It should be noted that this distinction is primarily based on location. Of these groups, the Western Shoshones inhabited and used the vicinity of the project area. Prior to the arrival of Euro-Americans into their aboriginal lands, the Western Shoshone occupied a large territory. Thomas, Pendleton, and Cappannari (1986:262) stated:

“Western Shoshone country extended from the arid reaches of Death Valley inhabited by the Panamint Shoshone, through the mountainous highlands of central Nevada into northwestern Utah, where it encompassed the area of the Gosiute of Tooele and Skull valleys and Deep Creek and the ‘Weber Ute.’ The northern boundary is rather arbitrarily taken as roughly the divide separating the Humboldt River drainage from the Snake and Salmon River area, where the Northern Shoshone lived; the people of the Duck Valley Reservation are also included.”

According to Steward (1997), Western Shoshone band affiliation was flexible and, therefore, it was difficult to determine aboriginal boundaries or areas of habitation based on band organization. Western Shoshone families did, however, return seasonally to establish winter and summer camps in the same general areas. Steward (1997) listed one village site in Ash Meadows. Both Western Shoshone and Southern Paiutes inhabited this village, called Kau-yai'-chits.

Like other Numic-speaking people, the Western Shoshone were once hunter-gatherers. There was great environmental and ecological variability throughout their aboriginal territory. For this reason, seasonal migration patterns and subsistence methods varied slightly from band to band. There were, however, general subsistence patterns that were common to all Western Shoshone bands. Small family groups from spring through fall conducted seasonal movement in search of favored gathering and hunting areas. During the winter, several families would gather into villages in relatively warm areas near food caches (Thomas, Pendleton and Cappannari, 1986).

Villages were often located near abundant plant sources, including tuhwada (greens) and Joshua tree buds that ripened in early spring. Availability of such plant resources allowed longer seasonal occupation of some camps. Throughout the rest of the year, the Western Shoshone families moved their campsites to other plant gathering areas. Mesquite and screw beans were gathered in the Ash Meadows area (Steward, 1997).

Because game was relatively scarce throughout Western Shoshone territory, plant gathering was the main subsistence activity of Western Shoshone bands. The variability of plant-gathering and processing methods of the Western Shoshone has been well documented (for examples, see Egan, 1917; Fowler and Fowler, 1971; Steward, 1941, 1997). Among the multitude of plants and plant parts used by the Western Shoshone were seeds, pine nuts, mesquite, salvia, cacti, and gourds (Egan, 1917; Steward, 1997; Thomas, Pendleton and Cappannari, 1986).

Although the Western Shoshone did not depend as much on hunting for food resources, there were several species of animals that were hunted regularly, including bighorn sheep, antelope, deer, mountain lions, and wolves (Pendleton and Thomas, 1983; Steward, 1941). Western Shoshone hunters employed hunting blinds, rock walls, or lines of stone cairns to conceal themselves when pursuing bighorn sheep (Pendleton and Thomas, 1983). Deer were driven into pits (Steward, 1941). Small game included rabbits, badgers, wildcats, porcupines, pocket gophers, ground squirrels, prairie dogs, woodchucks, muskrats, mice, chipmunks, weasels, some reptiles and fish, owls, hawks, eagles, crows, doves, mockingbirds, sage hens, quail, waterfowl, grasshoppers, crickets, cicadas, ants, bee eggs, and larvae (Egan, 1917; Steward, 1941, 1997; Stewart, 1980). Antelope and rabbit drives involved the communal efforts of Western Shoshone families (Egan, 1917; Steward, 1941, 1997).

5.3.3.4 Historic Setting

Southeastern California has long been a crossroads in the American West, a crossroads of cultures (both prehistoric and historic), a crossroads of economies, and a literal crossroads. The area began as part of the Spanish Empire, became part of independent Mexico, and then joined the United States at the cessation of the Mexican-American War. As part of the historical American West, southern California first was home to Mormon settlers bent on expanding their religious territory and bringing their doctrine to the local native populations. It then became a non-Mormon stronghold and a key link in the western transportation network.

The Historic Period is divided into several groupings that reflect Spanish, Mexican and Mormon influences, and also themes such as the development of mining, ranching and transportation corridors.

5.3.3.4.1 Spanish Explorations

Spanish explorers first came up the Colorado River in the early 1540s, but their search for precious metals only took them up the Colorado to the vicinity of the Gila River. The meager results of the Coronado expedition ended any grandiose schemes the Spanish may have had to conquer the Southwest. They did not visit the Colorado for another 200 years. While the Spanish developed a permanent presence in what is now New Mexico, they were much slower to colonize other areas of the Southwest. During the late 1760s and early 1770s,

the Spanish had secured the region known as Alta California and established missions along the coast between San Diego and Monterey. Many of these missions became thriving enterprises, and the most impressive of these was the San Gabriel Mission. The town that grew beside it, Los Angeles, soon became a commercial center in its own right. In following years, many attempts were made to establish a permanent land route between Spanish outposts in Sonora and Alta California. A route along the Gila River and across the Colorado through what is now Yuma was the most direct route, but the Quechan revolt of 1781 put an end to that development. For the rest of the Spanish period, land connections between California and Mexico were maintained along the Mojave Trail, which crossed the Colorado about halfway between Yuma and what is now Las Vegas. The Spanish began looking for a better connection to California by skirting north of the impassable Grand Canyon. In 1776, Father Francisco Garcés explored the Mojave Desert from the California end. Although it is unclear whether he actually entered what is now Nevada, he helped to establish the western end of what would later be called the Old Spanish Trail (Paher, 1971; Roske, 1986). In that same year, Father Silvestre Velez de Escalante explored eastern portions of what would become the Spanish Trail. The Old Spanish Trail was not established as a complete route until the late 1820s and early 1830s, several years after Spain lost control of Mexico and the rest of what is now the American Southwest.

5.3.3.4.2 Mexican Period

Trade connections between Santa Fe and Los Angeles developed quickly along what came to be called the Old Spanish Trail. Jedediah Smith was one of the first to realize the potential of the trail. He first traversed the route in 1826, traveling down the Virgin River to the Colorado and then on to California. In 1829-1830, Antonio Armijo came down the Virgin River to the Colorado below Grand Canyon, and then journeyed across the desert reaches to the Mojave River. He followed the Mojave to the Cajon Pass and then on to Los Angeles. Although Armijo's party passed south of the Las Vegas Springs, a member of his expedition was the first to record their existence (Paher 1971; Roske 1986). After Armijo paved the way, annual trading expeditions between New Mexico and Los Angeles became common, particularly during the period from 1830 to 1848 when the Mexican-American War ended. During this time a number of alternate routes were developed. Many travelers avoided the Colorado below the Grand Canyon. After descending out of the Utah mountains by way of the Virgin, travelers cut across the desert, establishing a direct route to the Mojave River. A less-well-documented activity during this period was slaving. Beginning in the Spanish period, Paiutes were often captured by Ute and Navajo raiders and sold as slaves in New Mexico or California. As a result, the Paiute tended to avoid the route until the Mormons put a stop to the trade in the late 1840s and early 1850s (Kelly and Fowler, 1986). When California gold was discovered in 1848, traffic on the trail increased tremendously.

5.3.3.4.3 Mormon Era

By 1849, Brigham Young had established plans for the State of Deseret, encompassing the Great Basin, the Colorado River drainage and most of Southern California. Brigham Young and other Mormon leaders built what later became known as the "Mormon Fort" in 1855, but it was only occupied for 2 years. The fort was constructed in support of the Mormon dream to expand throughout the Great Basin and California but Young's plans were destroyed in 1848, when Mexico signed the Treaty of Guadalupe Hidalgo and surrendered Alta California and everything above the Gila and Rio Grande to the United States. In 1850, California became a state, and in the same year the land east of California was divided into

the two territories of New Mexico and Utah. Despite these setbacks Mormon colonies developed during the early and middle 1850s. Eastern portions of the Old Spanish Trail were abandoned and the western portions became part of what was known as the Mormon Trail. A community developed in San Bernardino and Las Vegas became a stopping point between Salt Lake City and the California colony. The Fort was abandoned in February of 1857, although a few settlers remained to tend the fields and operate as a way station for travelers along the Mormon Trail. By September of 1858, most of the San Bernardino population had returned to Salt Lake City as tensions heightened between President James Buchanan and Brigham Young. Young was worried that war would break out, so he called for everyone to return to Salt Lake City. The few remaining Mormon settlers left the fort at that time. The situation in Utah never came to open conflict, but over 5,000 federal troops were stationed near Utah Lake until the eve of the Civil War. This tension colored interactions between the federal government and the Mormon community until well after the Civil War.

After the Civil War, a second period of Mormon expansion reached into Southern Nevada. The Mormon settlers pushed into both the upper and lower Virgin valleys as part of what came to be known as the Cotton or Dixie Mission. The communities of St. Joseph, St. Thomas and Callville developed during this time. St. Thomas was designed to grow crops in support of the miners in Eldorado Canyon, while Callville was supposed to establish a port on the Colorado. Most steamers could not make it that far up the river and the community failed to thrive. The Virgin Valley communities lived with a lot of political uncertainty during this time. With the creation of the Nevada and Arizona territories, and subsequent changes to the borders between Nevada and Utah, several of the communities were uncertain what state they were actually in (Belshaw and Peplow, 1980; Roske, 1986).

5.3.3.4.4 Mining and Ranching Era (1860s to early 1900s)

Mining has been and still is an active pursuit in the project area. Alan Hensher (2005) summarized the mining activities in the area very well as:

“In 1869, a prospecting expedition discovered copper and silver veins in the Clark Mountains. A supply center, named Ivanpah, arose at Ivanpah Spring, several miles from the silver deposits; the two main properties became the Beatrice and Lizzie Bullock. Mills were built at Ivanpah in the mid-1870s. The district reached its peak about 1879 and then declined rapidly during the early 1880s.

The Copper World, the other major strike, was developed in 1898, when a smelter was built at nearby Rosalie Wells. Although the production was large at times, the operations were erratic, and the Copper World shut down about World War I.

In 1879, gold and silver were found near Mountain Pass. This became the Mescal Mine. The property was developed in 1882 and remained active at least into 1887. The Mescal produced an estimated \$250,000 in bullion.

Silver ore was discovered in the Providence Mountains in 1880. The main property was the Bonanza King Mine. Two speculators in Colorado, Wilson Waddingham and Thomas Ewing, bought the property several years later. They built a mill at a nearby spring and sank a deep shaft. After producing \$1,500,000 in bullion, the mill burned in 1885; as the price of silver declined, mining became erratic, and work in

the district ended during the early 1890s. The Bonanza King was revived in 1906-1907 and 1915-1920.

Bob Black, an Indian, struck gold ore near Vanderbilt Spring, in the New York Mountains, in 1891, when a tent camp was founded. In late 1892, major development began. The main mines were the Gold Bronze and the Boomerang. Meanwhile, the Nevada Southern Railway was built into the area, and a railhead was established at Manvel. The veins were small, and the district's two mills were inefficient. The district began to decline in 1894, though some mining continued through the late 1890s.

Several prospectors from Goldfield, Nevada, found gold in the Castle Mountains in late 1907. A town named Hart was founded in early 1908, and a mill was built. The leading properties were the Oro Belle, Big Chief, and Hart Consolidated, but the veins were small and broken, and the district began to decline in 1909. Occasional mining continued until about 1915.

Mining began in the Vontrigger district during the 1890s, but the mines were small. After 1904, Albert H. Cram, a promoter, developed a copper deposit known as the California Mine, north of Goffs. He built a large camp and installed a leaching operation, which produced some copper. The nearest shipping point was Vontrigger, on the California Eastern Railway, two miles away. Cram discontinued work about 1911. Several miles to the west, in the Hackberry Mountains, the Getchell Mine was developed in 1925, and a large camp, also named Vontrigger, was built there, but the work soon stopped."

5.3.3.4.5 Development of Railroads (1905 to 1920s)

It was not until early in the twentieth century that Southern California was connected to Salt Lake City by rails. Montana Senator, William A. Clark intended to provide such a service; organizing the San Pedro, Los Angeles and Salt Lake City Railroad in 1901. That same year he began buying local lines in the Los Angeles area and began surveying for new lines toward Utah. Clark was not the only one who wanted to build a railroad. Stiff competition raged during most of 1901 and 1902 between Clark and the Oregon Short Line, owned by Edward Henry Harriman. At one point, both companies were building lines out of Utah and the competition became so intense that the crews came to blows in Meadow Valley Wash. Finally, they reached a compromise and combined their efforts. Work proceeded swiftly after the agreement, and track reached the Stewart Ranch by October of 1904. In January 1905, the Utah and California tracks were joined 23 miles south of Las Vegas.

5.3.3.5 Resources Inventory

The Ivanpah SEGS site and linear facilities were subject to 100 percent (Class III, or complete) archeological resources inventory by CH2M HILL. This inventory is based on both archive/background research and surface pedestrian reconnaissance survey. The results of the resource inventory are presented in the Sections below. Because of the lack of any architectural resources in the project area, a specific architectural resources survey was not conducted.

5.3.3.5.1 Archival Research

CH2M HILL commissioned a detailed record search by staff of the California Historical Resources Information System (CHRIS) at the San Bernardino County Museum using a definition of a 1-mile buffer zone around the project site and at least 0.25-mile buffer around linear facilities referred to as the “project area.” Eight cultural resources have been previously documented within this project area.

A total of 32 individual cultural resource investigation reports were cited by the CHRIS. Ten of these contain overview information about the project area. The remainder represent specific studies performed within the project area. No copies of these reports were provided initially by the CHRIS. On August 6, 2007, CH2M HILL requested copies of reports for studies conducted within 0.25 mile of the project area, per CEC guidelines. These copies are provided in Appendix 5.3C. Arranged in ascending order as cataloged by CHRIS, the reports are listed in Table 5.3-2. Table 5.3-3 gives summary information for sites located within one mile of the project area.

TABLE 5.3-2
Authors (Dates) and CHRIS/SCIC Catalog Number for Cultural Resource Investigation Reports

Authors (Dates)	CHRIS/SCIC Catalog Number
King, Chester and Dennon G. Casebier (1976)**	1060290*
King, Chester (1976) **	1060291*
Casebier, Dennon G. (1976) **	1060292*
Coombs, Gary B. (1979) **	1060738*
Musser, Ruth A. (1979) **	1060870*
Warren, Claude N. (1980) **	1060887*
Knack, Martha (1980) **	1060888*
Warren, Elizabeth Von Hill (1980) **	1060889*
Jenkins, Richard Charles (1982) **	1062017*
Hanks, Herrick E. (1976) **	1062555*
Fowler, Don D., Elizabeth Budy, Dennon Desart, Joyce Banth, and Alma Smith (1978) **	1060614
Greenwood, Roberta S. and Michael J. McIntyre (1979) **	1060763
Greenwood, Roberta S. and Michael J. McIntyre (1979) **	1060764
Barrer, James P., Carol H. Rector, and Phillip J. Wilke (1979) **	1060874
Taylor, Thomas T. and Ronald D. Douglas (1981)	1061156
Hall, Matthew C., Phillip J. Wilke, Doran L. Cart, and James D. Swenson (1981) **	1061219 (report not provided by CHRIS)
Bean, Lowell John, Sylvia Brakke Vane, and Jackson Young (1981) **	1061220
Mako, Michael E., Edgar B. Weil, Hill Weisbord, and Jaime Lytle-Webb (1982) **	1061280
Musser, Ruth A. and Mark Q. Sutton (1983) **	1061381
Dames & Moore (1985) **	1061479
Raferty, Kevin (1986) **	1061599
De Munck, Victor C. and Stephen Bouscaren	1061602

TABLE 5.3-2

Authors (Dates) and CHRIS/SCIC Catalog Number for Cultural Resource Investigation Reports

Authors (Dates)	CHRIS/SCIC Catalog Number
Raferty, Kevin (1986) **	1061605
Budy, Elizabeth E. (1986) **	1061613
Taylor, Thomas T. (1987) **	1062170
Young, Bertrand T. (1990) **	1062211
Bureau of Land Management **	1062218
Cleland, James H., Rebecca M. Apple, Andrew L. Cork, and Paul Friedman (1990) **	1062571
Barrer, James P. Carol H. Rector, and Philip J. Wilke (1979) **	1060874
Brock, James and Richard J. Wall (1986)	1061612
Shackley, M. Steven, Rebecca McCorkle Apple, Jan Wooley, and Robert E. Reynolds (1987) **	1061734
Cork, Andrew, W.G. Spaulding, D. Powers, L. Peterson, G. Davis, and T. Wahoff (1995) **	1063668

Notes:

* report contains overview information for project area

** Study area located within 0.25 mile of project area—copy provided in Confidential Appendix 5.3C

TABLE 5.3-3

Summary of Sites within 1 mile of the Project Area of Potential Effect

Site	Description	NRHP/CRHR Status	Effect
SBR-7694H	Los Angeles Department of Water and Power's Boulder Transmission Lines.	NRHP Eligible	None. Outside APE.
SBR-10315H	225-mile San Bernardino to Hoover Dam 132 kV electrical transmission line constructed from 1930 to 1931.	NRHP Eligible	None. Electrical connection will not result in adverse effect.
SBR-7347H	Metal strapping and a coil of bailing wire.	Not Eligible	None. Outside APE
SBR-7689H	Arrowhead Trail.	Not Eligible	None. Outside APE
SBR-1083-H	General sparse scatter of modern and historic trash.	Not Eligible	None. Outside APE
SBR-816	Rock shelter with smoked roof, slight midden, metate with smoothed centered surface.	Not Eligible	None. Outside APE
SBR-2342	Lithic flakes and burned rock.	Not Eligible	None. Outside APE
SBR 6956	Two bedrock milling slicks, possible rock shelters surrounding limestone outcrop.	Not Eligible	None. Outside APE

APE = Area of Potential Effect

The sites listed in Table 5.3-3 are further described below.

Site CA- SBR-7694H

This site consists of the Los Angeles Department of Water and Power's Boulder Transmission Lines. Originally constructed from 1933 to 1936, the line brought power from the newly constructed Hoover Dam to Los Angeles. Because of its direct connection to Hoover Dam, the site is considered eligible for nomination to the NRHP under criteria A for its association with events or broad patterns important in history. The location is well outside of the Ivanpah SEGS APE and will not be impacted.

Site CA- SBR-10315H

This site consists of the historic San Bernardino to Hoover Dam 132-kV electrical transmission line, constructed from 1930 to 1931. This line was constructed to provide power to the massive Hoover Dam construction project. Upon completion of the dam, the line was reversed to provide power from the dam to San Bernardino. Because of its direct connection and association with the Hoover Dam, the site is considered eligible for nomination to the NRHP under criterion A, for its association with events or broad patterns important in history. However, these lines fall between project sites Ivanpah 1 and Ivanpah 2 and are outside an area of direct impact. Also, because the physical lines and towers are not considered contributing elements to the significance of the site under criterion A, and given these components have been upgraded over time to newer equipment, no adverse impact is anticipated from installation of the electrical connection to these existing transmission lines.

Site CA- SBR-7347H

This site consists of one fragment of metal strapping and a coil of bailing wire. The location is well outside of the Ivanpah SEGS APE and will not be impacted. The site is considered ineligible for nomination to the NRHP or CRHR.

Site CA- SBR-7689H

This site consists of remnants of the Arrowhead Trail, a road opened in 1924 as a route from Los Angeles to Las Vegas. The location is well outside of the Ivanpah SEGS APE and will not be impacted. The site is considered ineligible for nomination to the NRHP or CRHR.

Site CA- SBR-1083-H

This site consists of general, sparse trash scatter including structural materials, harness parts, rope, and modern refuse. The location is outside of the Ivanpah SEGS APE and will not be impacted. The site is considered ineligible for nomination to the NRHP or CRHR.

Site CA- SBR 816

This site consists of a rock shelter with smoked roof, slight midden (no sherds or flakes noted), and metate (crude) with smoothed center surface. The shelter is about one meter deep by two meters wide. The location is well outside of the Ivanpah SEGS APE and will not be impacted. The site is considered ineligible for nomination to the NRHP or CRHR.

Site CA- SBR 2342

This site consists of lithic flakes and burned rock. The location is well outside of the Ivanpah SEGS APE and will not be impacted. The site is considered ineligible for nomination to the NRHP or CRHR.

Site CA- SBR 6956

This site consists of two bedrock milling slicks and two “rockshelters,” one of which contains milled lumber. No prehistoric material was observed at the rockshelters. Half of an obsidian nodule was recorded. The site is located well outside of the Ivanpah SEGS APE and will not be impacted. The site is considered ineligible for nomination to the NRHP or CRHR.

Local Historical Societies

Two local historical societies, the San Bernardino Historical and Pioneer Society and the Nevada State Museum and Historical Society, were contacted on June 27 and 28, 2007 respectively. No additional historical resources were identified. A summary of these contacts is provided as part of Appendix 5.3A.

5.3.3.5.2 Field Survey

CH2M HILL completed a surface-only, pedestrian reconnaissance survey of the Ivanpah SEGS project area, including the plant site, substation, administration and storage building, and project linears (natural gas supply pipeline, electrical transmission lines, and access roads) between April 25, 2007 and May 22, 2007. As per the latest CEC requirements (CEC, 2007), cultural resources surveys conducted were inclusive of the project site and linear routes extending to no less than 200 feet around the project sites and no less than 50 feet to either side of the right of way of the linear facilities. Besides the overhead electrical transmission lines, there are no historic architectural standing structures present in the project area.

The investigation began in the southernmost area of the project (Ivanpah 1) by using 15-meter transect intervals. However, after completing approximately 900 acres, it was apparent that the ground surface was heavily disturbed by frequent, braided ephemeral drainages. After consulting with BLM archaeologist John Murphy at the Barstow Field Office, it was determined that site potential of the project site was considered low, and that based on archaeological experience and Mr. Murphy’s intimate knowledge of the area, the highest potential for sites in the vicinity was located in the dunal margin surrounding the playa and on the eastern side of the lakebed, some distance from the project area. Therefore, after consultation with Mr. Murphy, transect intervals were increased to 30 meters.

Most of the project area possesses a low probability of containing archaeological sites. This is principally because of the lack of available water. Sites would be most likely to occur at the locations of streams or springs. No such locations are present in the project area. The active erosion from flash flooding and other natural processes has likely buried or obliterated evidences of archaeological sites. The entire project area has been dissected by braided, ephemeral washes, with very few locations of stable soils. Those areas that are stable contain either a desert pavement or cryptobiotic soils.

Areas with desert pavement or rock outcrops with desert varnish were examined more intensely. Surface visibility over most of the project area was excellent. Average visibility was approximately 90 percent.

Two historic sites and six Isolated Finds were recorded during the field investigation. Nearly all the major washes contained historic cans either in the bottom of the wash or on the sides. These artifacts were clearly not in their primary context and had washed down

during flash flood events from a source upstream. There are a number of springs that have historically been the location of some relatively large mining operations within Colosseum Gorge in the Clark Mountains. Ivanpah was a 160-acre townsite that was occupied by 300 men in 1870 with 15 adobe buildings including a hotel, two stores, an office, and houses (Hensher, 2005). About 0.5 mile to the east was the Bidwell Millsite. Given the size of the operation and the proximity of the townsite to a major drainage flowing out of the Clark Mountains to the east, there is no doubt that the cans found in the drainages originally came from Ivanpah, or other similar operations located in the Clark Mountains. Since these cans were secondarily deposited, they were not recorded as a cultural resource, but were noted with some basic measurements and descriptions in the field. Most of the cans dated to the late 1800s, putting them within the range of the mining operations.

Descriptions of the two newly recorded historic sites and six Isolated Finds follow.

CA-SBR-12574 Transmission or Telegraph Line

This site consists of an abandoned power transmission or telegraph line and associated access road running through Ivanpah 1. The wood poles have all been cut approximately 6 to 12 inches above the ground leaving the base in place. In a few locations the downed poles were still nearby, but most of the poles were no longer present. Other parts of the original line were found near most of the pole bases, including insulators, cross beams, steel nuts and bolts, steel cable, and steel brackets or plates.

The site is visible on Google Earth® aerial photos and can be seen both onsite and on the aerials on a heading of 37° traveling across Ivanpah Dry Lake bed and up the bajada on the western slope of the McCullough Range. It is not as easy to follow to the southwest, but it appears to be heading roughly towards the Mountain Pass Mine. There were no other artifacts found in association with the site.

The exact age of this line is undetermined, though based on the type of wooden poles present, it is expected to be over 45 years old. There is nothing indicating the site meets any of the criteria for nomination to either the NRHP or CRHR. Moreover, the site no longer retains integrity given it has been systematically dismantled. The site is considered ineligible for nomination to the NRHP or CRHR and, therefore, will not be adversely affected by the Ivanpah SEGs.

CA-SBR-12575 Two-track Road Segment

This site is a two-track dirt road heading nearly east-west across the southern part of the project area, bisecting Ivanpah 1. The road is very faint and has not been traveled in some time. Only one artifact was found in association with the road, IF1, which is a mule shoe found next to the road. It is possible this road was used to access the mines and mining townsites located in Colosseum Gorge in the Clark Mountains. There is nothing indicating the site meets any of the criteria for nomination to either the NRHP or CRHR. The site is considered ineligible and will not be adversely impacted by the Ivanpah SEGs.

IF1

This isolate consists of a single horseshoe found alongside CA-SBR-12575H. It was the only artifact in the area, and it was not clearly associated with CA-SBR-12575H. The horseshoe measures 4 inches by 6 inches, and due to its size, it is possibly for a mule.

IF2

This isolate is a single, obsidian flake found in the middle of an ephemeral wash. No other artifacts were associated with the flake and it likely was secondarily deposited in the wash during one or more flood events.

IF3

This isolate is a mining prospect located near the base of a large inselberg. No other artifacts are associated with the prospect. The dimensions of the prospect are 15 feet wide, 35 feet long, and 4 feet deep.

IF4

This isolate is a mining prospect located at the base of a large inselberg. A wooden 4-inch by 4-inch by 58-inch post serves as the claim marker at the eastern end of the prospect above the pit. No other artifacts are associated with the prospect. The piles of granite-like rock are located on either side of the prospect. The dimensions of the prospect are 10 feet wide, approximately 20 feet long, and approximately 10 feet deep.

IF5

This isolate consists of a lone chert biface found on the surface of a small rise between two ephemeral drainages. It is a late stage biface with a slight curve on the dorsal side. The biface is complete and unbroken. It measures 9.5 centimeters long by 3.2 centimeters wide with a maximum thickness of 0.8 centimeter.

IF6

This isolate is an obsidian nodule with a few flakes removed – possibly an ecofact. Found on desert pavement surface next to an ephemeral drainage.

5.3.3.5.3 Native American Consultation

CH2M HILL contacted the NAHC by letter on June 27, 2007, to request information about traditional cultural properties such as cemeteries and sacred places in the project area. The NAHC responded on June 29, 2007, with a list of Native Americans interested in consulting on development projects. Each of these individuals/groups was contacted by letter on June 29, 2007. As of August 13, 2007, no responses have been received. Copies of the contact letters are provided in Appendix 5.3A. Also, a detailed summary table of the results of consultations with the individual Native American organizations on the NAHC contact list is included in Appendix 5.3A.

The NAHC record search of the Sacred Lands file failed to indicate the presence of Native American cultural resources in the immediate project area. The record search conducted at the Information Center of CHRIS for CH2M HILL also failed to indicate the presence of Native American traditional cultural properties.

5.3.4 Environmental Analysis

This Section describes the environmental effects of Ivanpah SEGS construction and operations. CH2M HILL conducted a complete survey of the project area.

CH2M HILL conducted archival research; contacted other interested agencies, Native American groups, and historical societies; and conducted a complete field investigation. As a result of all these efforts, CH2M HILL detected one significant historic resource, CA- SBR-

10315H, that has the potential to be impacted by the Ivanpah SEGS project. No other significant prehistoric or historic archaeological remains, or any historically or architecturally significant buildings were identified to have potential for impact.

While CA-SBR-10315H, the historic San Bernardino to Boulder Dam electrical transmission line, is considered eligible for the NRHP under criterion A (the association with events or broad patterns important in history) for its direct association with the early operation of Hoover Dam, the impact to the transmission line as a result of construction of the Ivanpah SEGS is limited to installation of a new electrical connection. None of the physical properties of the transmission towers will be altered by making this new electrical connection. The connection will not change the character of the transmission line or alter its current setting. As a result, the site will not be adversely impacted. Therefore, no impacts on architectural resources are expected to occur. Further, both the CHRIS literature search and CH2M HILL's survey failed to identify significant archaeological sites. Therefore, no impacts to archaeological resources are expected to occur.

Although significant archaeological and historical sites were not found during the project field survey, it is possible that subsurface construction could encounter buried archaeological remains. If an unanticipated archaeological and/or historical resource were discovered during construction, then potential impacts would be mitigated to a less-than-significant level with the implementation of the mitigation measures identified in Section 5.3.6 below.

5.3.5 Cumulative Effects

A cumulative effect refers to a proposed project's incremental effect together with other closely related past, present, and reasonably foreseeable future projects whose impacts may compound or increase the incremental effect of the proposed project (Pub. Resources Code § 21083; Cal. Code Regs., Title 14, §§ 15064(h), 15065(c), 15130, and 15355). Cumulative projects are described in Section 5.6.7 and include the Desert Xpress Rail Line, improvements to Interstate 15, Las Vegas Valley Water District Pipeline, Southern Nevada Supplemental Airport (Ivanpah Valley Airport), and Table Mountain Wind Generating Facility. Although environmental analyses for most of these projects have not been completed at the time of preparation of this Application for Certification, standard mitigation measures exist to reduce impacts to cultural resources to a less-than-significant level, and it is anticipated that impacts to cultural resources from the cumulative projects, if any, would be mitigated to a less than significant level. The project is unlikely, therefore, to have impacts that would combine cumulatively with other closely related past, present, and reasonably foreseeable future projects.

5.3.6 Mitigation Measures

Although significant archaeological and historical sites were not found during the project field survey, it is possible that subsurface construction could encounter buried archaeological remains. For this reason, the Applicant proposes to implement measures to mitigate any potential adverse impacts that could occur if there were an inadvertent discovery of buried cultural resources. These measures include: (1) designation of a cultural resources specialist (CRS) to be on-call to investigate any cultural resources finds made during construction; (2) implementation of a construction worker training program; (3) monitoring during initial clearing of the power plant site and excavation at the plant site; (4) procedures for halting

construction in the event that there is an inadvertent discovery of archaeological deposits or human remains; (5) procedures for evaluating an inadvertent archaeological discovery; and (6) procedures to mitigate adverse impacts on any inadvertent archaeological discovery determined significant.

5.3.6.1 Designated Cultural Resources Specialist

The Applicant will retain a designated CRS who will be available during the earth-disturbing portion of the Ivanpah SEGS construction period to inspect and evaluate any finds of buried archaeological resources that might occur during the various construction phases. If there is a discovery of archaeological remains during construction, the CRS, in conjunction with the construction superintendent and environmental compliance manager, will make certain that construction activity stops in the immediate vicinity of the find until the find can be evaluated. The CRS will inspect the find and evaluate its potential significance, in consultation with CEC staff and the CEC compliance project manager (CPM). The CRS will make a recommendation as to the significance of the find and any measures that would mitigate adverse impacts of construction on a significant find.

The CRS will meet the minimum qualifications for Principal Investigator on federal projects under the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation. The CRS will be qualified, in addition to site detection, to evaluate the significance of the deposits, consult with regulatory agencies, and plan site evaluation and mitigation activities.

5.3.6.2 Construction Worker Sensitivity Training

The Applicant will prepare a construction worker sensitivity training program to ensure implementation of procedures to follow in the event that cultural resources are discovered during construction. This training will be provided to each construction worker as part of their environmental, health, and safety training. The training will include photographs of various types of historic and prehistoric artifacts and will describe the specific steps that will be taken in the event of an unanticipated discovery of cultural material, including human remains. It will explain the importance of, and legal basis for, the protection of significant archaeological resources. The training will also be presented in the form of a written brochure.

5.3.6.3 Monitoring

The Applicant will retain a qualified archaeologist to monitor excavations during the project's various construction phases. If archaeological material is observed by the monitoring archaeologist, ground-disturbing activity will be halted in the vicinity of the find so that its significance (CRHR eligibility) can be determined. If evaluated as significant, mitigation measures (avoidance or data recovery) will be developed in consultation with the CEC.

5.3.6.4 Emergency Discovery

If the archaeological monitor, construction staff, or others identify archaeological resources during construction, they will immediately notify the CRS and the site superintendent, who will halt construction in the immediate vicinity of the find, if necessary. The archaeological monitor or CRS will use flagging tape, rope, or some other means, as necessary, to delineate the area of the find within which construction will halt. This area will include the excavation

trench from which the archaeological finds came as well as any piles of dirt or rock spoil from that area. Construction will not take place within the delineated find area until the CRS, in consultation with the CEC staff and CEC CPM, can inspect and evaluate the find.

5.3.6.5 Site Recording and Evaluation

The CRS will follow accepted professional standards in recording any find and will submit the standard Department of Parks and Recreation historic site form (Form DPR 523) and locational information to the South Coastal Information Center of the CHRIS.

If the CRS determines that the find is not significant, and the CEC CPM concurs, construction will proceed without further delay. If the CRS determines that further information is needed to determine whether the find is significant, the designated CRS will, in consultation with the CEC, prepare a plan and a timetable for evaluating the find.

5.3.6.6 Mitigation Planning

If the CRS, CEC staff, and CPM determine that the find is significant, the CRS will prepare and carry out a mitigation plan in accordance with state guidelines. This plan will emphasize the avoidance, if possible, of significant archaeological resources. If avoidance is not possible, recovery of a sample of the deposit from which archaeologists can define scientific data to address archaeological research questions will be considered an effective mitigation measure for damage to, or destruction of, the deposit.

The mitigation program, if necessary, will be carried out as soon as possible to avoid construction delays. Construction will resume at the site as soon as the field data collection phase of any data recovery efforts is completed. The CRS will verify the completion of field data collection by letter to the project owner and the CPM so that the project owner and the CPM can authorize resuming construction.

5.3.6.7 Curation

The CRS will arrange for curation of archaeological materials collected during an archaeological data recovery mitigation program. Curation will be at a qualified curation facility meeting the standards of the California Office of Historic Preservation. The CRS will submit field notes, stratigraphic drawings, and other materials developed as part of the data recovery/mitigation program to the curation facility along with the archaeological collection, in accordance with the mitigation plan.

5.3.6.8 Report of Findings

If a data recovery program is planned and implemented during construction, as a mitigation measure, the CRS will prepare a detailed scientific report summarizing results of the excavations to recover data from an archaeological site. This report will describe the site soils and stratigraphy, describe and analyze artifacts and other materials recovered, and draw scientific conclusions regarding the results of the excavations. This report will be submitted to the curation facility with the collection.

5.3.6.9 Inadvertent Discovery of Human Burials

If human remains are found during construction, project officials are required by the California Health and Safety Code (Section 7050.5) to contact the county coroner. If the

coroner determines that the find is Native American, he/she must contact the NAHC. The NAHC, as required by the Public Resources Code (Section 5097.98), determines and notifies the Most Likely Descendant with a request to inspect the burial and make recommendations for treatment or disposal.

5.3.7 Involved Agencies and Agency Contacts

Table 5.3-4 lists the agencies involved in cultural resources management for the project and a contact person at each agency. These agencies include the NAHC and, for federal lands, the Office of Historic Preservation, and BLM. At the federal level, the Ivanpah SEGS project area is on land managed by the BLM and it is required to assure that its land management actions comply with the Federal Land Policy Management Act and NEPA, including assessing impacts to scientifically important resources such as cultural resources. For this area, the BLM contact for archaeological resources is the Needles Resource Area Archaeologist.

TABLE 5.3-4
Agency Contacts for Ivanpah SEGS Cultural Resources

Issue	Agency	Contact
Native American traditional cultural properties	Native American Heritage Commission	Dave Singleton Associate Governmental Program Analyst (916) 653-6251 email:ds_nahc@pacbell.net
Federal agency NHPA Section 106 compliance	Office of Historic Preservation	Milford Wayne Donaldson State Historic Preservation Officer (916) 653-6624 email:mwdonaldson@parks.ca.gov
Federal agency NHPA Section 106 compliance	Bureau of Land Management Needles Field Office	John Murray District Archaeologist (760) 326-7014 email:John_R_Murray@ca.blm.gov

5.3.8 Permits Required and Schedule

In addition to certification by the CEC, removal of archaeological resources from federal lands requires a Cultural Resource Use Permit from BLM. Field Survey work for the project was completed under CH2M HILL's Cultural Use Permit No. CA-07-17. Because federal lands are involved in this project, a Fieldwork Authorization was also required from the BLM Needles Field Office to conduct the field survey. The cultural resources field survey for this assessment was carried out under BLM Fieldwork Authorization CA-690-07-07.

If a previously undiscovered archaeological site is found during construction on federal land the newly discovered site would require NRHP eligibility evaluation. Also, consultation with the SHPO under Section 106 of the NHPA is required given the project's location on federal land, in order to consider whether the project would affect historic properties listed on, or meeting the criteria for listing in, the NRHP. Consultation with the

SHPO and/or the state or local lead agency(s) is required if the project would affect historic properties listed on, or meeting the criteria for listing in, the NRHP or CRHR.

The following Section 106 compliance procedures apply to the project, as appropriate:

1. If the federal agency finds no historic properties that the undertaking might affect, the agency informs the SHPO, documents the finding, and proceeds with the undertaking.
2. If the agency finds historic properties and determines that the project would not affect them, then the agency informs the SHPO and documents the finding. The SHPO has 15 days in which to object to the finding, after which the agency may proceed with the undertaking.
3. If the agency finds historic properties that the project would affect, the agency and SHPO consult to determine whether the effect would be adverse. If the agency and SHPO find that the effect would not be adverse, the agency informs the ACHP, documents the finding, and the ACHP has 30 days in which to object to the finding. If there is no objection, the agency proceeds with the undertaking.
4. If the agency finds historic properties and determines that the project effects would be adverse, the agency and SHPO consult to determine how to mitigate these effects. This consultation culminates in a Memorandum of Agreement (MOA) between the agency, SHPO, and ACHP. The ACHP and SHPO are allotted 30 days in which to review and comment on a draft MOA. If the parties agree, the agency proceeds with the undertaking after signing and executing the MOA. If the agency does not agree to prepare an MOA, the ACHP must provide its comments on the undertaking within 60 days.

The Section 106 regulatory compliance process thus takes a minimum of 15 days if historic properties are found. This process can take from 60 to 90 days or more, depending on the complexity of the issues involved, the necessity of preparing a MOA, and other factors.

If Native American burials are discovered on federally owned land, the NAGPRA would require that the federal land management agency halt construction in the immediate vicinity of the find and contact a lineal descendant of the buried person or culturally affiliated organization. The regulations implementing NAGPRA (43 CFR 10) require that the federal agency notify the appropriate Native American persons or organizations within 3 days of the find. These regulations also require that construction activity in the immediate vicinity of the find stop for 30 days or until a written agreement is executed to adopt a recovery plan for the treatment or removal of the human remains.

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